

# 2012 FLOOD MITIGATION

ROBERT P. KELLY, P.E.  
DIRECTOR OF ENGINEERING  
CITY OF WESTLAKE





# 2011 YEAR IN REVIEW

- DYE TESTING
  - 350 PERFORMED
- PUBLIC MEETINGS
  - LOWER DOVER, DOVER DITCH, CEDARWOOD AND BROADMORE
- ENGINEERING STUDIES
  - URS WWTP STUDY
  - CORNWELL AND BONNIE BANK I/I STUDY
- CEDARWOOD BACKWATER VALVE INSTALLATION
- SEWER REHABILITATION PROJECT
  - WESTHILL / ALLEN AREA
- WATERPROOFING PERMIT ENFORCEMENT
  - MORE STRINGENT DYE TEST POLICIES IMPLEMENTED
  - LICENSED ENGINEER NEEDS TO SIGN OF ON ALL WATERPROOFING PERMITS AND INCORPORATES FLOOD MITIGATION CONDITIONS.
- BACKWATER VALVE TESTING
  - DETERMINED THAT INFERIOR MODELS WERE INSTALLED AND COORDINATED WITH INSTALLERS TO VERIFY THAT PROPER PRESSURE RATED MODELS WERE NOW USED.
- RESEARCH (FIELD CREWS DURING MAJOR RAIN EVENTS)
  - OBSERVED SANITARY MANHOLE WATER LEVELS
  - REVIEWED HOW THE INFRASTRUCTURE REACTED

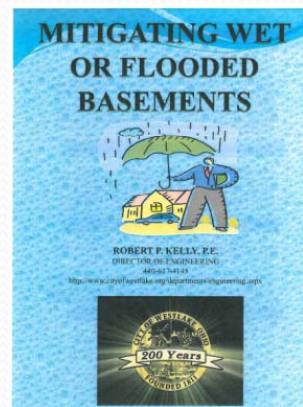
# 2012 AGENDA

- EDUCATION
- PERMIT ENFORCEMENT
- MAINTENANCE
- INSPECTION
- ENGINEERING
- REHABILITATION

2012			
<b>January</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<b>February</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29	<b>March</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<b>April</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
<b>May</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<b>June</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	<b>July</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<b>August</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
<b>September</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	<b>October</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<b>November</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	<b>December</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

# EDUCATION

- DYE TESTING
  - 135 DYE TESTS CARRIED OVER TO 2012
- YARD DRAINAGE INSPECTION
- MITIGATING WET OR FLOODED BASEMENT BROCHURE
  - AVON LAKE
  - AVON
  - FAIRVIEW PARK
  - MIDDLEBURG HEIGHTS
  - NORTH OLMSTED
  - NORTH RIDGEVILLE
  - PARMA



# PERMIT ENFORCEMENT

- 2010 WATERPROOFING PERMITS 43
- 2011 WATERPROOFING PERMITS 93
- DYE TEST FOR WATERPROOFING PERMITS
  - COMPROMISED PIPING
  - CONDITIONS OF PERMIT
  - RECOMMENDATIONS
- WORK WITHOUT PERMIT
  - FINES



# MAINTENANCE

- MAJOR DITCHES
- CULVERTS
- 29 CITY RETENTION BASINS
- STORM MAINS
- CURB INLETS
- SANITARY MAINS



# ENGINEERING INSPECTION

- MAJOR DITCH INSPECTION
  - ALL MAJOR DITCHES WILL BE INSPECTED EVERY 2 YEARS
- RETENTION BASIN INSPECTION
  - ALL PRIVATE SUB-DIVISION OR MULTI-FAMILY BASINS WILL BE INSPECTED EVERY 3 YEARS
    - CAPACITY RESTRICTION ISSUES
    - FUNCTIONALITY
    - CLEAN WATER
    - MAINTENANCE



# REHABILITATION

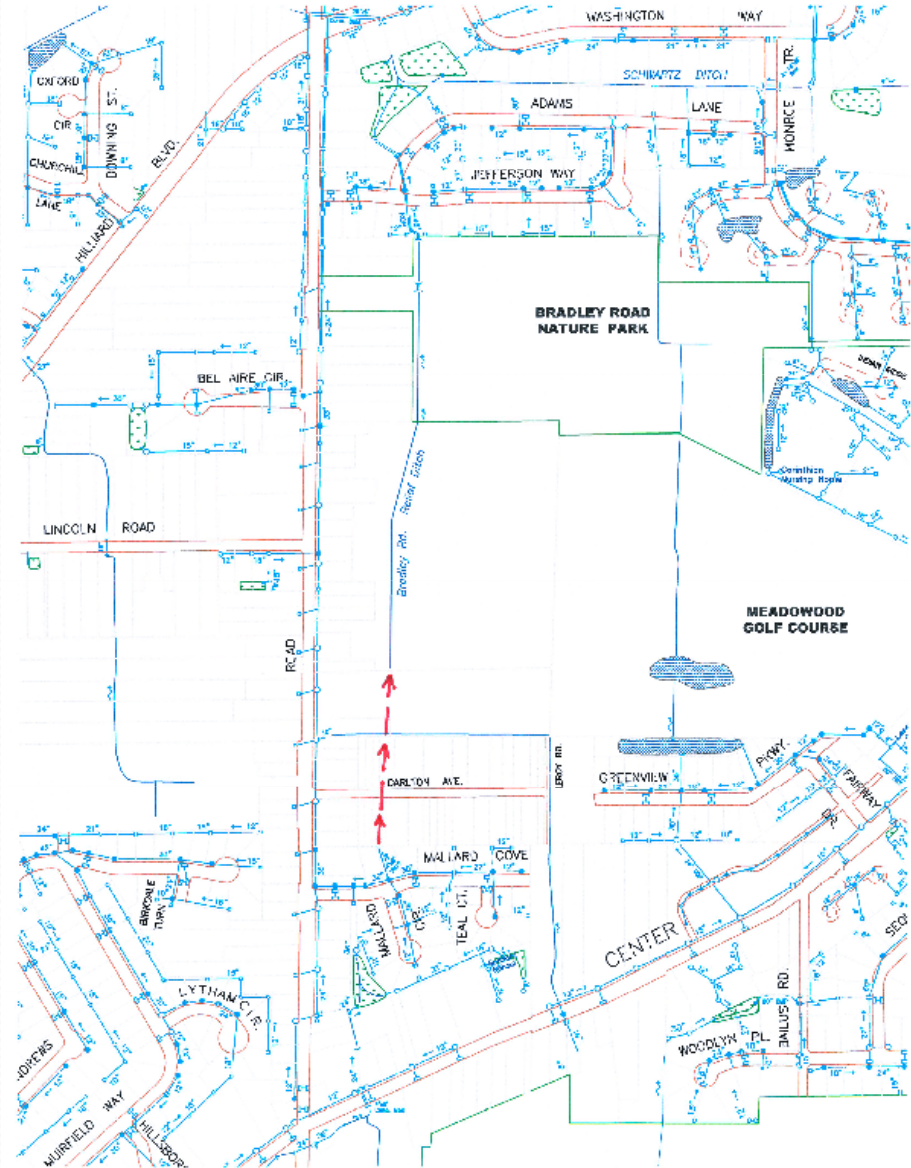
- BROADMORE STORM SEWER RE-ALIGNMENT
- BRADLEY ROAD RELIEF DITCH
- SANITARY SEWER REHAB.
  - CORNWELL AND BONNIE BANK
  - MELROSE AREA
- SANITARY MANHOLE REHABILITATION



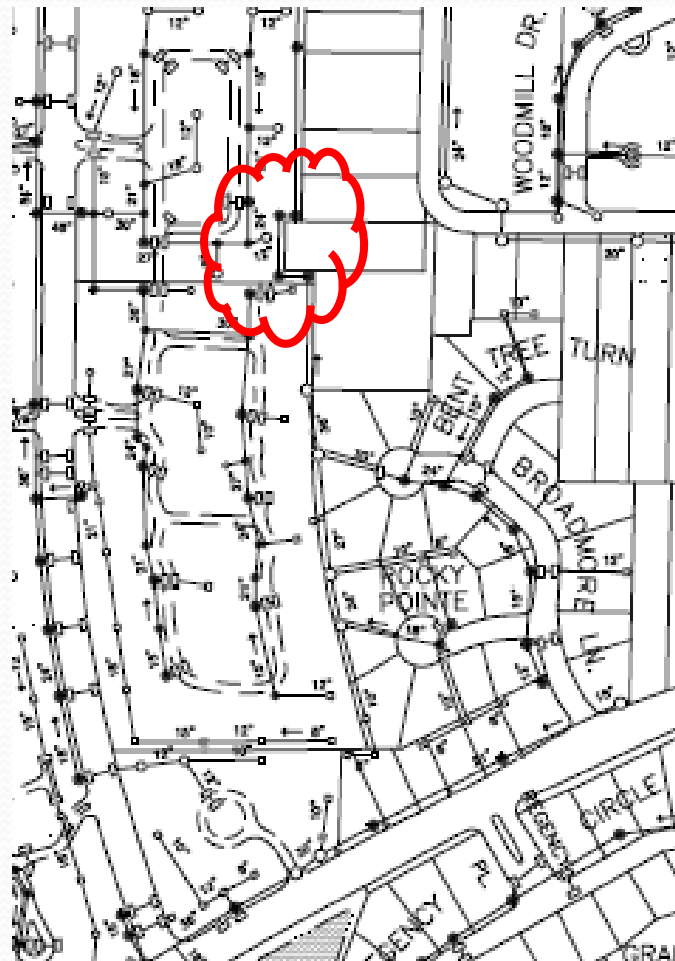


# BRADLEY ROAD RELIEF DITCH

- EXTEND DITCH TO MALLARD COVE
- INCREASES STORM CAPACITY ON BRADLEY ROAD

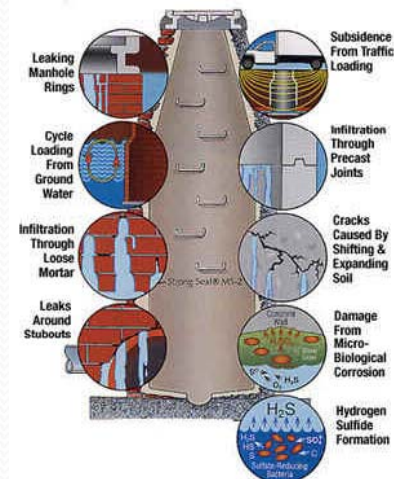


# BROADMORE STORM RE-ALIGNMENT



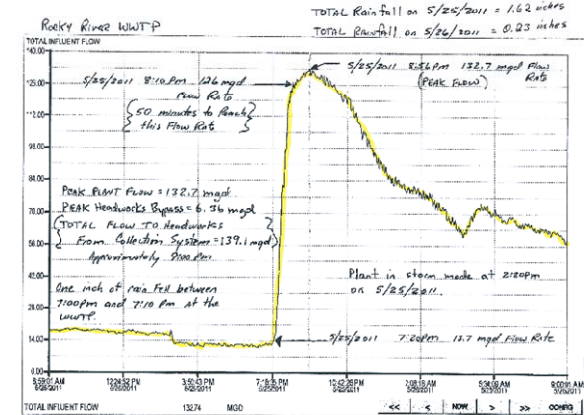
# ENGINEERING

- URS WWTP STUDY
- SANITARY SEWER FLOW METERING PROJECT
- SANITARY SEWER MANHOLE INVESTIGATION

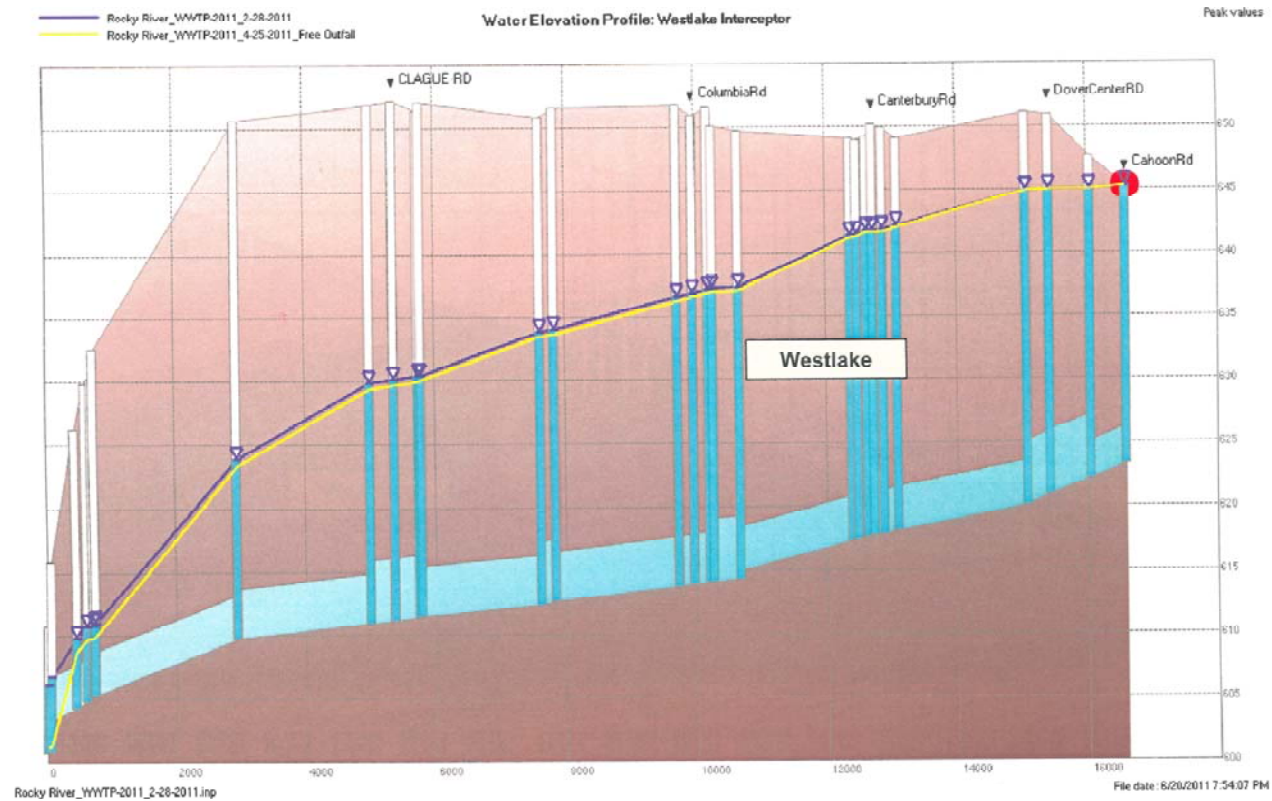


# URS WWTP ANALYSIS

- SANITARY INTERCEPTOR DURING MAJOR RAIN EVENT
  - CAPACITY IS UNDERSIZED
  - CAUSES SURCHARGING
  - WWTP ONLY CAUSES BACK-UP THE FIRST 2500
- RECOMMENDATIONS
  - SYSTEM WIDE I/I REDUCTION
  - RELIEF SEWER PARALLEL TO THE INTERCEPTOR



# URS WWTP ANALYSIS

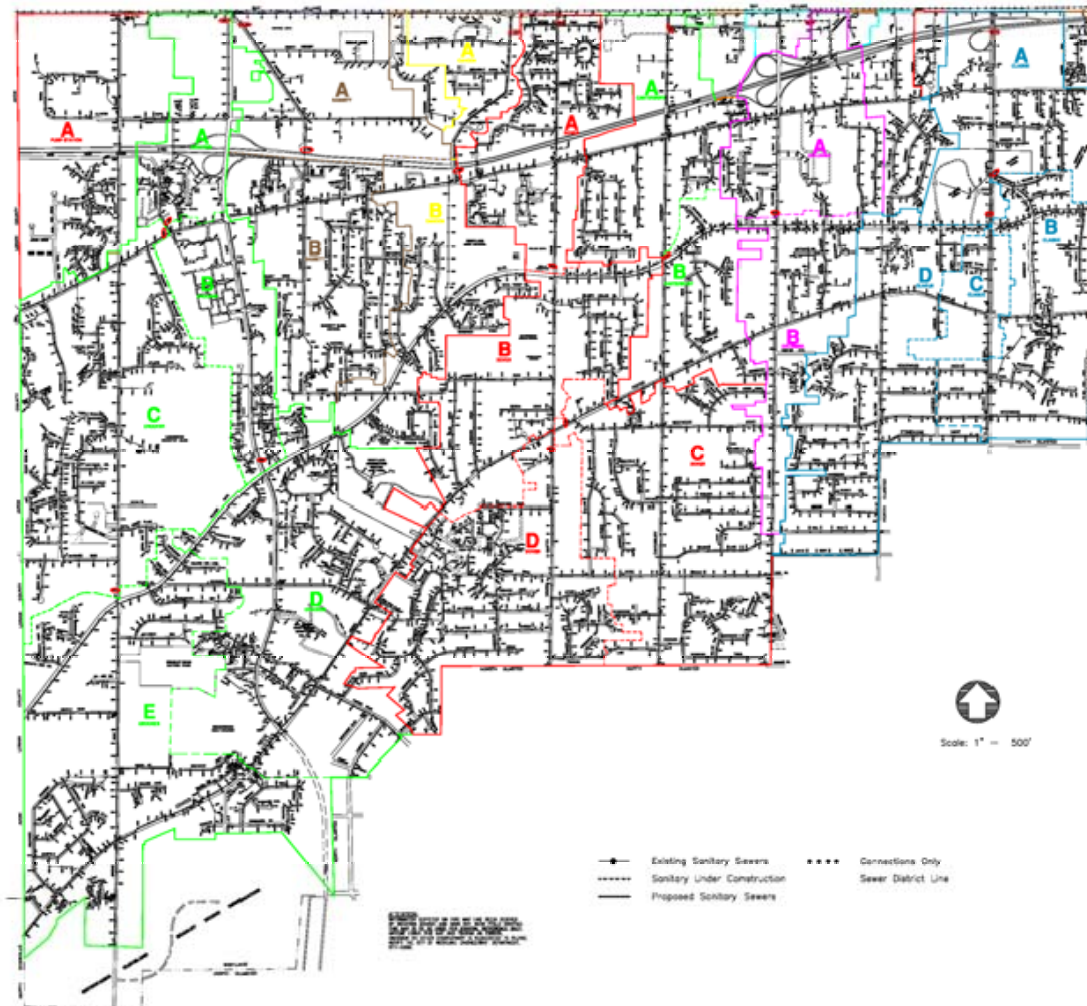


Hydraulic grade line along Westlake Interceptor  
Blue HGL is existing Condition; Yellow HGL is free outfall condition

# CITY WIDE FLOW METERING

- SPRING 2012
- 23 FLOW METERS
  - 60 DAYS OF MONITORING
- SUB-BASINS FROM EACH OF THE MAJOR TRUNK LINES
  - CLAGUE
  - COLUMBIA
  - CANTERBURY
  - DOVER CENTER
  - CAHOON
  - CROCKER / BASSET
- PRELIMINARY ESTIMATE
  - \$170,000

SANITARY DRAINAGE AREA MAP – CITY OF WESTLAKE



# MANHOLE I/I

- VENTED LIDS IN AREAS WITH FLOODING CONTRIBUTE STORM WATER TO SANITARY
- INFLOW DISH OR PLUGS REDUCE INFLOW INTO MANHOLE

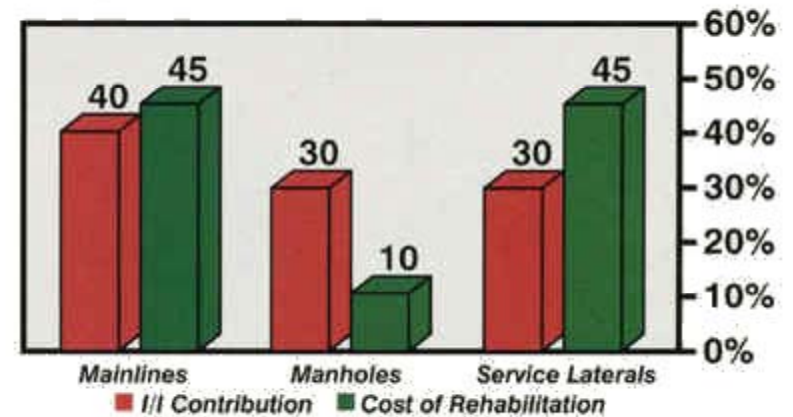


# CITY WIDE MANHOLE REHABILITATION PROJECT

- 30%-50% OF I/I IS FROM SANITARY MANHOLES
- INSPECT ALL 2500 SANITARY MANHOLES IN THE CITY
  - UTILIZING IN HOUSE STAFF
  - STRUCTURAL ISSUES
  - I/I ISSUES



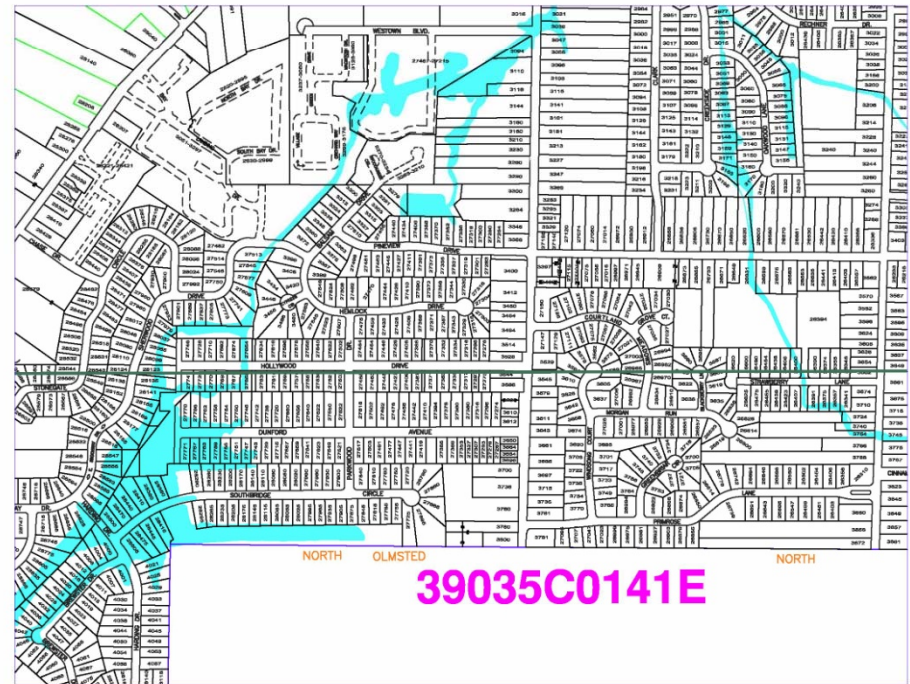
Comparison of I/I Contribution vs. Cost of Rehabilitation





# SANITARY MANHOLE LID PROGRAM

- TARGET AREAS WITH SEVERE FLOODING
- INSTALLED BY CITY FORCES
  - NO TOOLS
  - NO SPECIAL SKILL
- IMMEDIATE RESULTS



# THE END

- QUESTIONS OR COMMENTS

